

## **Profile of ‘Dr Ahmed Shibli’**

**C.Eng. (Chartered Engineer), FIMMM (Fellow Institute of Materials, Minerals and Mining)**

*DOB:* 27<sup>th</sup> March 1947

*Place of Birth:* Rawalpindi, Pakistan

*Came to Britain:* as a student for studying Materials Science M.Sc. course and research, at the University of Manchester, Institute of Science & Technology (UMIST): September 1971

### **Studies**

- 1) Five-year primary school education ‘Government Primary School Hothla’, a village school about 20 miles from Islamabad with one room class room, Pakistan.
- 2) Five-year secondary school education in ‘Government High School Kahuta’, a small town about 20 miles from Islamabad, Pakistan. Was Head Monitor in the School and was awarded various academic yearly prizes.
- 3) Four-year degree level graduation course (B.Sc. in Physics) from Government College Rawalpindi, Pakistan.
- 4) Two years M.Sc. course in Physics from Rajshahi University, Bangladesh. Was sent there on Pakistan Council Scholarship.
- 5) Two years M.Sc. (Course + Research) in Materials Science from the University of Manchester, Institute of Science & Technology (UMIST), UK.
- 6) Ph.D. in Metallurgy and Corrosion Science, from University of Swansea on a research grant from British Steel, Shotton, Wales, UK. Worked at British Steel, Shotton, UK.

### **First Employment**

*Project Engineer:* Babcock & Wilcox (now Doosan Babcock) – Renfrew, Scotland.

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## PROFESSIONAL CV

### Summary of Professional Achievements

Dr Ahmed Shibli is a practising Materials Scientist. He is the Founder and Head of European Technology Development Ltd. - a UK based Research and Consulting Company based in Leatherhead, Surrey. He has been the leader of a number of European and International projects on the evaluation, properties, integrity and lifing of materials for high temperature plant. Dr Shibli has been running European Creep Collaborative Committee (an umbrella grouping for some 45 high-temperature industry and research organisations) and established many of its R&D development programmes over the years.

Dr Shibli was the leader of a team of European scientists responsible for developing the HIDA (High-temperature Defect Assessment) Procedure. He also led a team of international (European and Japanese) researchers developing 'e-Lifing' – a compendium of Lifing Procedures for Power Plants'.

One of the major tasks of Dr Shibli has been to bring together European industry and research organisations and help with technology transfer – funded by the European Commission. He has also co-ordinated and led a number of other international industry projects involving European and Japanese researchers and industry engineers.

Dr Shibli has published over 150 papers and edited and published over 60 international journals and books on; a) 'materials issues' and, b) 'technology for development' – a voluntary initiative to help technology transfer to the Developing Countries.

Dr Shibli has organised and chaired a number of international conferences and presented invited/ keynote papers in the UK, Germany, France, Portugal, Japan, China, India, Korea, Pakistan, and the USA. The most famous conferences initiated by Dr Shibli have been a series of 'HIDA' and 'ECCC Creep' Conferences. The most recent 7<sup>th</sup> HIDA conference was held in May 2017 at the University of Portsmouth. The other six HIDA conferences were held at the French Atomic Energy, Saclay, France (1998); MPA Stuttgart (Germany); Churchill College, University of Cambridge; ISQ, Lisbon (Portugal); University of Surrey (UK); Mitsubishi Heavy Industry, Nagasaki, Dec 2014 (Japan). Dr Shibli was the Chairman of all these conferences.

In May 2016, Dr Shibli organised and chaired a conference on modern power plant materials at Wuhan University, China, which was attended by over 200 delegates from around the world with many attending from Chinese universities and industry.

### PRINCIPAL FIELDS OF TECHNICAL EXPERTISE

#### *Metallurgist by profession*

- Behaviour of cracks in high temperature plant components (led the development of the European unified procedure known as 'HIDA' – High-temperature Defect Assessment).
- Prominent authority in the development and understanding of new high strength steels for power and process plant.
- Investigation and analysis of failures in power plant boilers and other industrial components.

- Creep and fatigue behaviour.
- Dissimilar metal weld/ joint performance.
- Cracking in fossil and nuclear pressure vessels and piping/ tubing operating at high (500 – 700°C) and relatively low temperatures (300 – 400°C).
- Risk Based Management (RBM), Power Plant Cyclic Operation and Benchmarking.
- Power Plant cost reduction and efficiency improvement.

## RECENT ACHIEVEMENTS

- Since setting up ETD Ltd. I have set up and led a number of industrial projects involving UK, European, Asian, North American, African and Japanese industry (including Mitsubishi Heavy Industry, Sumitomo Metals, Alstom Power, Kyushu Electric, GE, EDF, ENEL, ESB, ESKOM, TransAlta, GDF-Suez/ Engie, TNB, Malakoff + many more).
- I have organised many major international events in the UK, USA, China, Japan and Europe on power plant condition/ life assessment, maintenance, defect assessment, probabilistics in creep and fatigue, risk based maintenance of industrial plant and so on.
- I have led and run large projects and was chief executive of **European Creep Collaborative Committee (ECCC)** - a grouping of 44 European power and petrochemical companies involving ExxonMobil, Siemens, EDF, Manturbo, Doosan Babcock, Dalmine, Tenaris, Alstom, Stuttgart, Darmstadt and Denmark Technical Universities, and many others.
- Now lead and coordinate projects of the **European Pressure Equipment Research Council (EPERC)**.
- I have led, Co-ordinated and carried out some of the largest industry-academia R&D projects for the **European Commission**, prominent amongst those being 'HIDA' defect/ crack assessment project (referred to above), various other creep and fatigue crack growth projects and Thematic Networks on high temperature materials development and behaviour.
- I now lead a number of **international industry projects** for the utilities in Europe, USA, Canada, South Africa and Asia.

**I have the record of successful completion of a large number of multi-million Euro/ Pound European and international industry projects.**

## ACADEMIC AND PROFESSIONAL QUALIFICATIONS

B.Sc. University of Punjab, Lahore, Pakistan

M.Sc. (Physics), University of Rajshai, Bangladesh  
M.Sc. (Materials Science), University of Manchester, Institute of Science & Technology (UMIST), UK  
Ph.D. University of Wales, Swansea, UK

FIMMM (Professional Member Institute of Materials, Mining and Materials, London)  
MloD (Member Institute of Directors, London)  
C.Eng. Chartered Engineer

## **POSITIONS HELD**

### **British Steel:**

1973-1977: Research Assistant

### **Doosan Babcock Ltd.**

1978-1981: Research Scientist

1981- 1986: Senior Research Scientist

1986 to 1994: Principal Engineer

1993 to 1994: General Project Manager (European Commission's Collaborative Brite-Euram Projects)

### **ERA Technology Ltd.**

1994: Principal Engineer & Group Leader

1995: Consultant Metallurgist

1996 to April 1998: Technical Executive

### **European Technology Development Ltd.**

May 1998- ongoing: Founder and Managing Director

## **INDUSTRY, RESEARCH & DEVELOPMENT, AND MANAGEMENT EXPERIENCE**

### **British Steel (1973 to 1977)**

**1973 to 1977:** Conducted research and development work on the improvement of mechanical and electrochemical characteristics of aluminium coated steel products.

### **Mitsui Babcock Energy Ltd. – Now Doosan Babcock (1978 to 1994)**

**1978:** Commenced work with **Mitsui Babcock Energy Ltd** (formerly Babcock and Wilcox), UK. Mitsui Babcock is a large international power plant boiler design and manufacturing company. At Babcock I worked in the Research and Development/ Technology Centre on the

problems of power plant boiler materials. Specific responsibilities in this job included study of new high strength and high performance materials (such as ASTM Grade 91 steel) for high efficiency and high output power plant. Other major projects were creep and fatigue crack initiation and growth in all type of power plant materials and welded components.

**1978 to 1994:** During this period, as a Babcock employee, provided consultancy to English and Scottish electricity companies i.e., Central Electricity Generating Board (CEGB), National Power, Power Gen, Scottish Power, Nuclear Electric and Scottish Nuclear.

During this period also acted as consultant to Ansaldo and ENEL (both Italy) and other European power plant manufacturers and operators on the specific problems of boiler materials performance and development.

**1980 to 1992:** Leader of the teams of UK research investigators from industry and universities on the investigation of creep and creep crack growth problems of boiler materials, especially riser and supply pipes.

**1982 to 1984:** In charge of formulating and writing of quality assurance standards for Babcock on technical aspects and methods of high temperature mechanical testing. Improved the Babcock large creep testing laboratory from analogue to a digital high precision testing lab., into one of the most advanced creep testing laboratory in the UK.

**1992 to 1994:** Initiated and developed and became Project General Manager and Team Leader of two European Commission funded projects on creep crack growth in power plant boiler components and use of fracture mechanics at high temperatures. These projects involved ten partners from six countries, (UK, Germany, Spain, Portugal, Holland and Sweden). These partners were three large industries, two small industries, two universities (University of Stuttgart and Imperial College London, and three large research institutes.

**1993 to ongoing:** a) Member of VAMAS Technical Committees TWA11 and TWA19 engaged in formulating standards for creep crack growth testing, b) Founder member of the European Pressure Equipment Research Council (EPERC).

**1994:** Given, by the European Commission, the task of carrying out a survey of a number of European high temperature testing laboratories and making recommendations for harmonising and standardising of their testing practices in creep and creep crack growth.

### **ERA Technology Ltd. (1994 to April 1998)**

**1994 to November 1997:** Became Leader of a large project (BE5524 'CREEP') funded by the European Commission and run on behalf of the 'European Creep Collaborative Committee' – a grouping of European industries. The project was aimed at harmonising and standardising, within Europe, creep data generation, exchange and analysis procedures.

Thirty-five industries and research institutes from across Europe participated in this project. The project was completed successfully and resulted in the publication of procedures which are now widely practised in Europe. As a part of this project I was in-charge of organising two *Conferences* on the subject – one at VDEh (German steel institute), Dusseldorf, Germany, and the other at the Institute of Mechanical Engineering, London.

**1995/96:** *Project 'HIDA'*: Initiated, formulated and then led a four million Euros four-year (1996 to 1999) duration large European Commission funded project on the 'Validation, Expansion

and Standardisation of European High Temperature Crack Assessment Procedures'. Thirteen organisations from seven European Countries participated in this project.

This was one of the largest EU R&D project at that time. This project harmonised creep and creep crack growth testing and data analysis across Europe and resulted in the preparation of a European database and software for crack assessment in nuclear and non-nuclear plant components.

A number of conferences (during and after the project execution) were organised by me on this theme in France (at Commissariat a l'Energie Atomique, Saclay), Germany, UK (Universities of Cambridge, Surrey and Portsmouth – May 2017), Portugal (together with the Portuguese Welding Institute – ISQ), Japan (Nagasaki in collaboration with Mitsubishi Heavy Industry- Dec. 2014).



**HIDA-7 Conference, 15-17th May 2017, University of Portsmouth, UK .** Prof. Graham Galbraith, Vice-Chancellor University of Portsmouth, and Dr Ahmed Shibli, Conference Chairman, addressing at the Conference opening ceremony.

**1995/96: Project 'SOTA':** Initiated, formulated and led a three-year (1996 to 1998) duration European Commission funded project on the 'Development of Creep Crack Growth Testing and Data Analysis Procedures for Weldments'.

**1996: Project 'Crack':** Initiated and led a European Commission funded Thematic Network on 'Cracking in High Temperature Industry Materials'.

As a part of this project I organised a *workshop* involving 21 power, petrochemical, and nuclear industries, and research institutes from around Europe.

**1997: Project 'Weld-Creep':** Initiated and formulated European industry and European Commission funded Thematic Network on 'Creep Strength of Welds'. This project involved 37 industrial and research organisations from across Europe and was aimed at harmonising and standardising high temperature plant component strength and therefore design and life assessment methodologies based on weld strength and behaviour. Two conferences were organised in connection with this project.

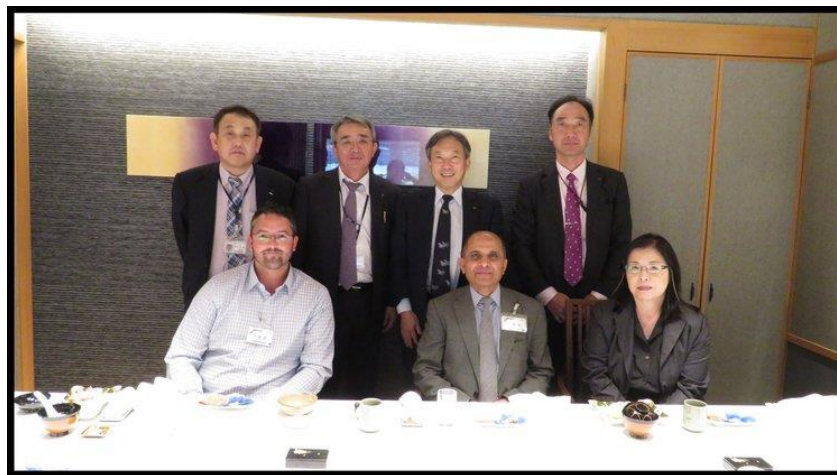
**1997 to 2000: Project 'HTI Forum':** Initiated European Commission funded 'High Temperature Industry Forum'. A *workshop* was also held involving 21 European industrial and research organisations. This was a unique platform for European high temperature industry from nuclear, fossil power, petrochemical and process sectors, and was aimed at discussing and prioritising research and development in the area of materials, design, and plant life extension.

*While at ERA, I had the major responsibility for industrial project development, industrial liaison and developing technical and industrial business for the company. This was of great benefit to the UK economy and established UK's technical leadership in Europe and beyond.*

### **European Technology Development Ltd. - ETD (May 1998 - ongoing)**

Formed the above company to initiate and execute European and international R & D projects in the area of high temperature plant materials, component cracking and life extension. The company has access to experts in Europe, USA, Japan and elsewhere and through this resource provides expert advice, and executes projects for clients worldwide.

At ETD, amongst other things, have **developed new and innovative tools and instruments** (in collaboration with multi-national companies) for industrial plant inspection, safety and security enhancement and life assessment/ extension of older plants. Examples of such tools include: a) the development of a **Portable Scanning Force Microscope (P-SFM)** in collaboration with a Russian/ Irish company NT-MDT for early stage damage detection in industrial components, b) **Electrical Discharge Sampling Equipment (EDSE)** initially developed by KMTL and improved by ETD, c) **Portable Precision Hardness Tester** developed by ETD, and, b) **'Obikou'** pipe strengthening technology developed for the repair and strengthening of high temperature plant components.



**Collaboration, 2016** - Meeting of ETD staff with the management of Chugoku Power Company (Hiroshima, Japan) to sign a collaboration agreement

d) **Now studying** the development of **mini-robots and drones** for industrial inspection and repair.

Through ETD Ltd. I have employed dozens of highly qualified graduates and trained a number of fresh graduates from the UK universities who then obtained employment in multi-national companies such as GE, Siemens etc. and brought into the UK investment worth about 15 million pounds.



## ORGANISATION OF INTERNATIONAL SCIENCE CONFERENCES IN THE UK AND OVERSEAS

Through ETD I have organised numerous international science and engineering conferences in the UK and in many countries abroad. We normally hold two such conferences every year. The latest examples include: a) organisation of an international conference in April 2016 at the University of Wuhan, China where about 250 delegates from Chinese steel making and power generation industries, UK, European, Japanese and US industries participated; b) Organisation of an international conference in Poland in May 2015.



**China Conference, 2016** - P91, P92, P23 and P24 Conference held in Wuhan, China, in April 2016. Dr. D Robertson of ETD is sitting in the front row (6th from left) and Dr. A Shibli of ETD, the Conference Chairman, is sitting in the middle (11th from left).

## SOME OF THE TYPICAL PUBLICATIONS

(Author and Editor of about 200 technical papers in journals, conference proceedings and a number of books and special issues of journals such as IJPV&P, Materials at High Temperature and OMMI)

Shibli, I.A.

'Oxidation jacking induced cracking in simulated fillet welds', Nuc. Energy, 25, No 1, pp 47-56, Feb 1986

Shibli, I.A.



'Investigation of failure problems in cold bent riser and supply pipes', Int. J. Pres. Ves. & Piping, 24, pp303-336, 1986.

Shibli, I.A., Davies, D.E.

'The effect of oxidation on sintering characteristics of A1 powder and the effect of some minor metallic additions', Powder Metall., 30, No2, pp97-102, 1987.

Shibli, I.A., Summers, A.A.P, Ham, W.M.

'Property validation of a graded composition transition joint'. Proceedings of the 'Third international creep conference'.

University of Wales, Swansea, UK, 5-10 April 1987, p741. Published by Pineridge Press, Swansea, UK.

Shibli, I.A.

'Science and Technology in Third World Development', Invited paper presented at the Conference of the Chinese Academy of Sciences (Beijing, Sept. 1987) and published in the Conference Proceedings.

Shibli, I.A.

'Low temperature (360°C) creep crack growth characteristics of a C-Mn steel', Mat. Sc. & Engr., A104, 1988, pp 29 35.

Shibli, I.A.

'Formability and electrochemical characteristics of aluminium dry powder coatings', Mat. Sc. & Tech., 5, pp 605-608, June 1989.

Shibli, I.A.

'Materials development for modern power station boilers', in the Proceedings of the 'International symposium on advanced materials', Islamabad, Pakistan, 18-20 Sep. 1989, pp 222-230. Published by the University Grants Commission, Islamabad.

Shibli, I.A.

'Characteristics of aluminium powder coatings', in the Proceedings of the 'International symposium on advanced materials', Islamabad, Pakistan, 18-20 Sep. 1989, pp 353-360. published by the University Grants Commission, Islamabad.

Shibli I. A.

'Overview of the high temperature defect assessment project', Published in the proceedings of the International HIDA Conference, held on 15-17 April 1998, at Commissariat a l Energie Atomique, Paris, France. Also being published in the Materials at High Temp. journal.

Shibli I.A, Al-Abed B, Nikbin K

Scatter bands in creep and fatigue crack growth rates in high temperature plant materials data', Published as the above paper.

Al-Abed B, Shibli I A, Le Mat-Hamata

'Creep and fatigue crack growth in high temperature materials', being published in the Proceedings of the Conference on 'High Temperature Plant Integrity Issues', being held at Cambridge University on 22 to 24 September, 1998.

Shibli I A, Le Mat-Hamata N

'Creep crack growth testing and data analysis for welds', published in the Proceedings of the I Mech E Conference on 'Integrity of High Temperature Welds', held on 3-4 November, 1998, at Nottingham, UK.

F Starr, I A Shibli, J E Castle and R W Walker  
'Expert System for Failure Analysis in High Temperature Plant', published in the Proceedings of I Mech E Parsons Conference, June 2000.

Starr F and Shibli A  
'Fundamental Issues in the Development of Austenitic and Nickel Based Alloys for Advanced Supercritical Steam and High Temperature Indirect Fired Gas Turbine Systems', published in the Proceedings of I Mech E Parsons Conference, held in June 2000.

- **Since the year 2000 published numerous papers on crack assessment, power plant benchmarking, cost analysis, cyclic operation of conventional and CCGT power plants, RBM/ RBI, P91 steel, weld repairs and a host of other topics.**

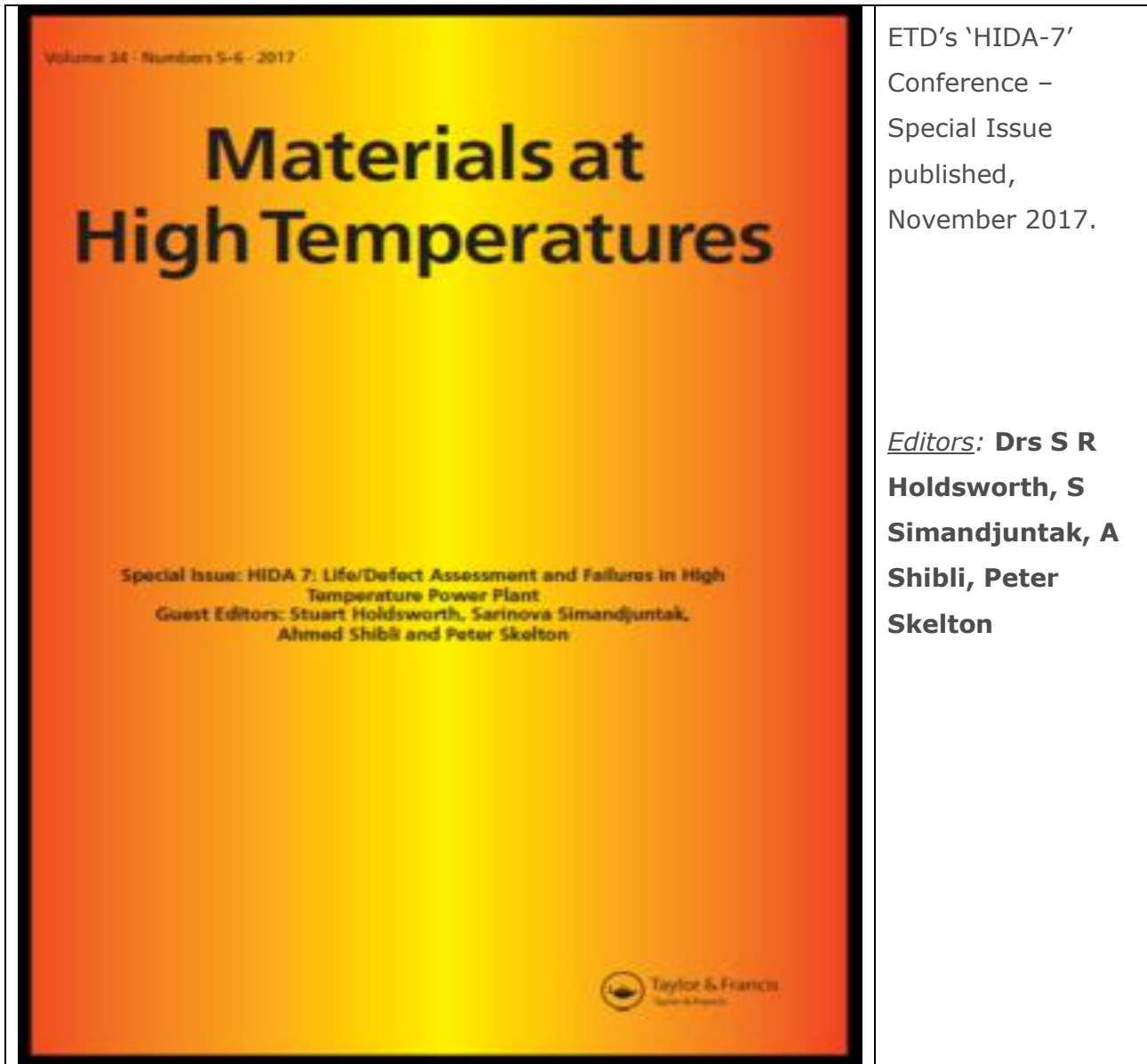
## EDITORSHIP

### Books

1. Co-editor of a five-volume publication on 'Creep Data Generation, Analysis & Development', Published by ERA Publications Department, UK, in 1998. This publication is now used as a fundamental reference on the subject by European R & D organisations and industry.
2. Editor of the International HIDA Conference Proceedings entitled 'Creep and Fatigue Crack Growth in High Temperature Plant Materials'. Held in Paris, France, April 1998. Published by Science Letters, London, UK.
3. Editor of the Proceedings of the International Conference 'Cyclic Operation of Power Plant – Technical, Operation and Cost Issues', 25 – 27 June October 2001, London, UK.
4. Co-Editor of the Proceedings of the International Conference 'Integrity of High Temperature Welds', 16 – 18 September 2002, Lisbon, Portugal. Published by ISQ, Lisbon.
5. Editor of the Proceedings of the International Conference 'Risk Based Management of Power Plant Equipment', London, 21 – 23 October 2002, London, UK.
6. Editor of the Proceedings of the International Seminar 'Advanced Creep Data for Plant Design & Life Extension', 26 September 2003, Prague, Czech Republic.
7. Book Published with Woodhead/ Elsevier in 2014, titled 'Coal Fired Power Plant Materials and Life Assessment' – ISBN 978-0-85709-431-5.

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Since 2003 **edited 15 other conference proceedings** for the conferences held in the UK, USA (3 conferences), Poland, Japan (Nagasaki, Dec 2013 on Life and Crack Assessment in High Temperature Plant) and more, and a number of Special Issues of international science journals.



ETD's 'HIDA-7' Conference – Special Issue published, November 2017.

*Editors:* **Drs S R Holdsworth, S Simandjuntak, A Shibli, Peter Skelton**

## **AWARDS AND RECOGNITIONS**

**1999:** Entry in **Who is Who**

**2000:** Entry in **Who is Who in the Engineering**

**2001:** Awarded **Smart Award for Innovation** by the UK government.

**2002:** Entry in **Who is Who in UK Business**

**2014:** Won '**International Business of the Year Award**', in Leatherhead and District Business Award Ceremony.

**2017: Appeared in the Parliamentary Review** alongside with the Prime Minister, Theresa May, for Innovation in Engineering. Awarded in the Houses of Parliament in September 2017.

**2018: Appeared in the Parliamentary Review** alongside with the Prime Minister, Theresa May, for Innovation in Engineering. Awarded in the Houses of Parliament in September 2018.



ETD Ltd. Managing Director Dr Ahmed Shibli with The Rt Hon Lord Pickles, Chairman of The Parliamentary Review, in the Houses of Parliament, UK, September 2018.

## **WORK IN PAKISTAN**

Over the years I have organised Courses, Seminars and Conferences on various topics of Science and Technology in Lahore, Karachi and Islamabad and lectured in various universities, research organisations and at the Science Foundation on voluntary and self-funding basis. I have also sponsored and financially supported various science and engineering conferences in Pakistan. Also see some information on this in the next section.

Visited Pakistan in 2014 as a Member of the Pakistan Commissioners – a group of expatriate Pakistani and European professionals to study the situation with regards to education

improvement and ethical business opportunities in Pakistan. Visited a number of charitable institutions and Chambers of Commerce in Karachi, Lahore and Islamabad.

## CHARITABLE WORK PROFILE

In 1983 set up a charity registered in Scotland (Registration no. ED19/91/JP) called 'Third World Science, Technology and Development Forum' (STD Forum).

- The Forum carried out the following **voluntary and unpaid activities**:

### 1) PUBLICATION OF THE REFEREED JOURNAL 'SCIENCE, TECHNOLOGY & DEVELOPMENT'

Started publishing a quarterly journal 'Science, Technology & Development' in 1983 through Frank Cass Publishers, London (ISSN 0950-0707), as its Chief Editor. This *refereed journal* was published for 15 years until 2001. *This was aimed at creating an awareness in the university students, lecturers, scientists, technologists and engineers at large (both UK and abroad) re the use of technology and science for poverty alleviation in the developing countries.*

### 2) ORGANISATION OF INTERNATIONAL CONFERENCES, WORKSHOPS AND SCIENCE EXHIBITIONS

- Organised a number of International Conferences and Workshops in the UK and overseas. These were as follows:
- April 1990: Organised 2-day International Conference on '**Science, Technology & Development: North-South Co-operation**' at the University of Strathclyde, Glasgow, UK. Published Conference Proceedings April 1991, Frank Cass Publishers, London. Also, published a book (ISBN 0 7146 3455 7). The conference was attended by 130 delegates from 25 countries.
- April 1993: Organised 2-day International Conference on 'Science and Technology in Third World Development' at the University of Strathclyde, Glasgow, UK. It was organised in collaboration with the British Council and the Developing Countries Research Unit of the University of Strathclyde, Glasgow. Published its Conf. Proceedings in April 1994, Frank Cass Publishers, London. The conference was attended by 150 delegates from 33 countries. It was attended by delegates of the World Bank, ILO Geneva and Overseas Development Administration (ODA), London.
- December 1994: Organised 2-day International Conference on 'Strategies Towards Science & Technology-Based Development and Transition in the Maghreb' (Maghtech '94), at the University of Sfax, Tunisia. Published Conference Proceedings in December 1995, Frank Cass Publishers, London.
- September 1996: Organised 4-day International Conference on: 'Reconstruction & Development – the Role of Science, Technology', University of Natal,

Pietermaritzburg, South Africa. Published Conference Proceedings in August 1997, by Frank Cass, London.

- April 2000: Organised 3-day International Conference on 'Technology and Development in the New Millennium' at the University of Karachi, [Pakistan](#). The Conference Proceedings were published in the form of a book (ISBN 0-9648260-0-3).
- April 1994: Organised, as a part of the **International Science Festival Edinburgh**, an exhibition and Festival on '**Technology for Development**' at Princes Gardens, Edinburgh, Scotland. This included exhibits on Wave Energy equipment from the UK, grain storage silos from India, micro-hydro power from Vietnam, solar toys for school children, solar fridge for storing vaccines in remote regions in developing countries, and, much more. All of this was organised by a group for volunteer scientists with no financial support from outside. This was visited, amongst others, by Her Royal Highness, Princess Ann (As the UNICEF Ambassador), Prof Heinz Wolfe (as the Science Advisor to the Royal Family), and Lord provost of Edinburgh.



Dr Shibli explaining the 'Technology for Development' Exhibition to Her Royal Highness Princess Ann, and, Involvement of the British future generations (school the children) in the 'use of technology for development'.

- April 1994: Sponsored by the British Council, organised a one-day Seminar on 'Technology & Development', at the British Council, Edinburgh, Scotland.
- Organised Monthly talks in the Universities of Strathclyde and Glasgow for many (about 12) years on the issues of Third World Development with specific reference to food, healthcare, water, sanitation and in general the use of technology for poverty alleviation.

### 3) SLAP 'SCIENCE LITERATURE AID PROJECT'

This was the project of the STD Forum and lasted for about 10 years. It involved collecting books and journals, especially those on medicine, health care, agriculture and other technology & development related issues, from the UK individuals and libraries and sending them to deserving institutions in the developing countries. A few examples include Tanzania, Sri Lanka, Vietnam, Columbia, Cuba, India, Bangladesh, South Africa and Pakistan.



A number of Workshops were held in the UK to discuss the issue of helping poorer countries with the surplus literature from the UK, Europe and North America. The major one was the European Workshop held in Glasgow in September 1998.

In addition to the literature, occasionally laboratory equipment and computers were also donated to the educational institutions in the developing countries.

## OTHER ACTIVITIES

- Member of the Board of Trustees (1998-2001), Sutton Grammar School, Surrey.
- Ph.D. *External Examiner* for the University of Strathclyde, Glasgow, 1992. The project dealt with solar energy issues
- Ph.D. *External Supervisor* for Open University, 2014. The project dealt with new steels for modern, higher efficiency lower pollution fossil power plant steel ‘ASME P91’.
- Ph.D. *External Examiner* for Imperial College, London, 2018. The project dealt with new steels for modern, higher efficiency lower pollution fossil power plant steel ‘ASME P91 and P92’.